

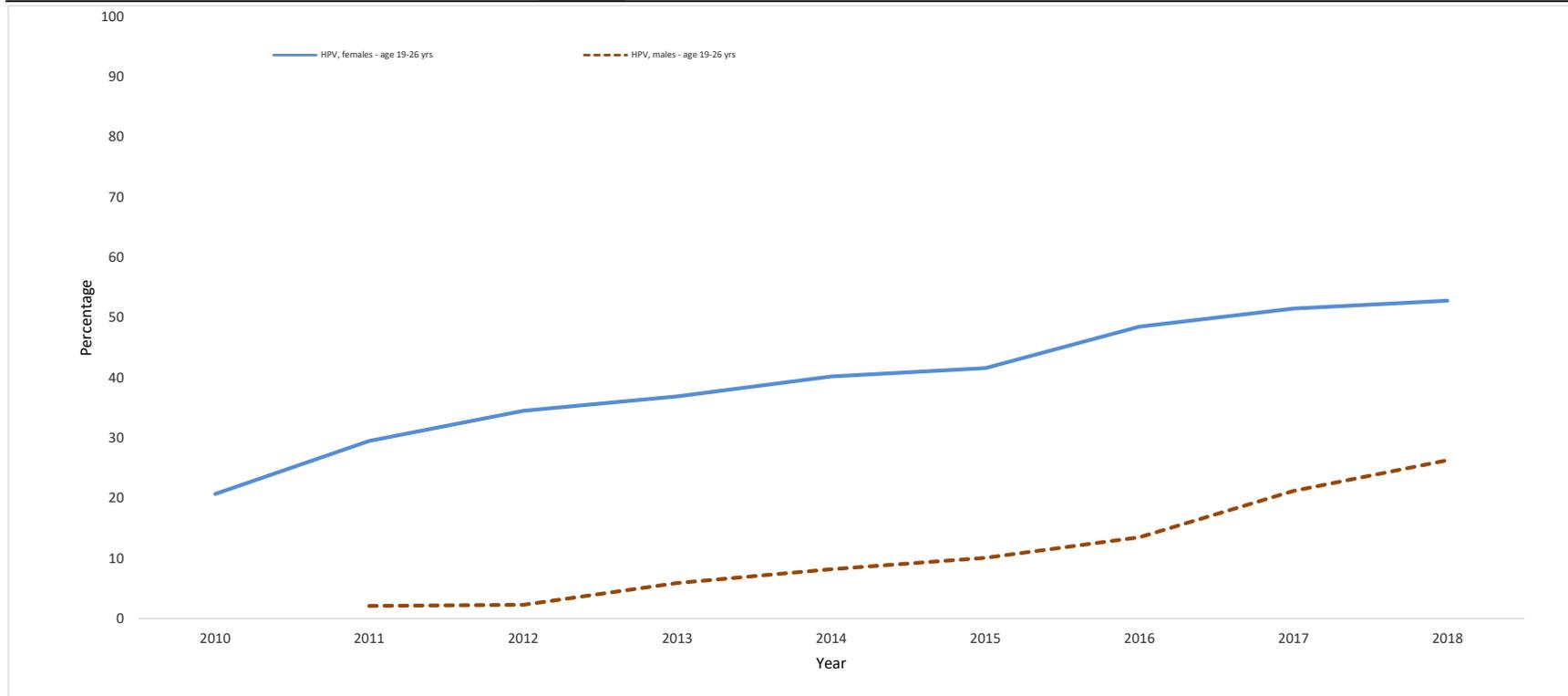
SUPPLEMENTARY BOX 4. Estimated proportion of adults aged 19–26 years who received at least one dose of human papillomavirus (HPV) vaccine, by age group, sex, and race/ethnicity — National Health Interview Survey, United States, 2018

Supplementary Tables/Figure	Result summary
Proportion of Adults Aged 19–26 Years Who Received at least one dose of HPV Vaccine	<p>In 2018, among females aged 19–26 years, 52.8% reported receipt of at least one dose of HPV vaccine, similar to the estimates for 2017. Asians (39.3%) had lower coverage compared with whites (56.5%). Among females aged 19–21 years and 22–26 years, HPV vaccination coverage was 53.3% and 52.5%, similar to the estimates for 2017, respectively. Among males aged 19–26 years and 22–26 years, HPV vaccination coverage (at least one dose) was 26.3%, and 21.8%, increases of 5.2 and 6.7 percentage points, compared with the estimates for 2017, respectively. Among males aged 19–21 years, HPV vaccination coverage was 34.4%, similar to the 2017 estimate. HPV vaccination (at least one dose) among females aged 19–26 years who had not received HPV vaccination prior to age 19 years was 10.4%, similar to the estimate for 2017. Among males aged 19–26 years who had not received HPV vaccination prior to age 19 years, HPV vaccination was 4.2%, similar to the 2017 estimate. Among women aged 19–26 years, Asians (39.3%) had lower coverage compared with whites (56.5%), but coverage for blacks (45.2%), Hispanics (49.6%), and adults who indicated other race (57.9%) was similar to that for whites (Table 1).</p>
Age at First Dose of HPV Vaccine	<p>Among females aged 19–26 years, 4.0% reported receiving the first dose of HPV vaccine at 8–10 years, 16.1% reported receiving the first dose of HPV vaccine at 11–12 years, 59.9% at 13–17 years, 7.7% at 18 years, and 12.3% at 19–26 years. Among males aged 19–26 years, 4.4% reported receiving the first dose of HPV vaccine at 8–10 years, 8.2% at 11–12 years, 56.3% at 13–17 years, 16.0% at 18 years, and 15.1% at 19–26 years. Among respondents aged 19–26 years, the difference between the age reported at the time of the interview and the age at which respondents indicated that the first dose of HPV vaccine was received was ≥ 14 years for 2.5% of females and for 0.7% of males. This would imply receipt of vaccination</p>

	in 2004 or earlier, before HPV vaccine was licensed for use in 2006 (Table 2).
Trends in the estimated proportion of adults aged 19–26 years who received at least one dose of HPV vaccine, by age group	HPV vaccination increased from 20.7% in 2010 to 52.8% in 2018 among women aged 19–26 years, and from 2.1% in 2011 to 26.3% in 2018 among men aged 19–26 years (test for trend: $p < 0.01$ for both groups) (Figure).

SUPPLEMENTARY BOX 4, FIGURE. Estimated proportion of adults aged 19-26 years who received at least one dose of human papillomavirus (HPV)* vaccine, by age group – National Health Interview Survey, United States, 2010-2018

	Unweighted sample size (2010-2018)	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average annual change (95%CI)	Linear trend test p-value
HPV, females - age 19-26 yrs	16,272	20.7	29.5	34.5	36.9	40.2	41.6	48.5	51.5	52.8	3.8 (3.3, 4.3)	<0.01
HPV, males - age 19-26 yrs	12,668		2.1	2.3	5.9	8.2	10.1	13.5	21.2	26.3	3.4 (2.5, 4.3)	<0.01



Abbreviations: HPVVP = Human papillomavirus.

* The 2010 HPV vaccination coverage estimate among males is suppressed due to relative standard error > 30%.

SUPPLEMENTARY BOX 4, TABLE 1. Estimated proportion of adults aged 19-26 years who received at least one dose of human papillomavirus (HPV) vaccination, by age group, sex, and race/ethnicity* - National Health Interview Survey, United States, 2018

Vaccination, age group, and race/ethnicity	Sample size	% (95% CI)	Simple difference from 2017
HPV vaccination among females (at least 1 dose), ever[†]			
19-26 years			
Total	1,069	52.8 (48.9, 56.6)	1.3
White	601	56.5 (51.4, 61.5)	-0.9
Black	128	45.2 (35.1, 55.6)	-2
Hispanic	218	49.6 (42.2, 57.1)	10.8 [§]
Asian	65	39.3 (25.8, 54.7) [§]	-5.9
Other	57	57.9 (40.3, 73.7)	1.9
19-21 years			
Total	307	53.3 (46.5, 60.0)	1.5
22-26 years			
Total	762	52.5 (47.9, 57.0)	1.2
HPV vaccination among males (at least 1 dose), ever[†]			
19-26 years			
Total	1,027	26.3 (23.0, 29.9)	5.2[§]
19-21 years			
Total	327	34.4 (28.1, 41.3)	0.7
22-26 years			
Total	700	21.8 (18.2, 25.8)	6.7[§]
HPV vaccination (at least 1 dose) during ages 19-26 years, among females without reported HPV vaccination prior to age 19 years**			
Total	561	10.4 (7.8, 13.8)	1.8
White	280	8.8 (5.9, 13.1)	0.6
Black	76	-- ^{††} --	--
Hispanic	130	14.8 (8.3, 25.2)	--
Asian	45	-- --	--
Other	30	-- --	--
HPV vaccination (at least 1 dose) during ages 19-26 years, among males without reported HPV vaccination prior to age 19 years**			
Total	792	4.2 (2.8, 6.3)	-1.6
White	447	4.1 (2.4, 6.9)	-1.4
Black	90	-- --	--
Hispanic	156	-- --	--
Asian	63	-- --	--
Other	36	-- --	--

Abbreviations: CI = confidence interval; HPV = human papillomavirus

* Race/ethnicity was categorized as follows: white, black, Hispanic, Asian and "other." In this report, persons identified as white, black, Asian, or other race are non-Hispanic. Persons identified as Hispanic might be of any race. "Other" includes American Indian/Alaska Native and persons who identified multiple races. The five racial/ethnic categories are mutually exclusive.

[†] Respondents were asked if they had ever received the HPV shot or cervical cancer vaccine.

[§] p<0.05 by t-test for comparisons between 2018 and 2017 within each level of each characteristic.

[§] p<0.05 by t-test for comparisons with white as the reference.

** The denominator includes persons 19-26 years without HPV vaccination prior to age 19 years, and the numerator includes those in the denominator who reported first HPV dose at age 19-26 years.

^{††} Estimate is not reliable due to small sample size (n<30) or relative standard error (standard error/estimates) >0.3.

SUPPLEMENTARY BOX 4, TABLE 2. Age at first dose of human papillomavirus (HPV) vaccination* and difference between age at interview[†] among adults aged 19-26 years – National Health Interview Survey, United States, 2018

Characteristic	Females (N=606) [§]		Males (N=203) [¶]	
	No.	Weighted %	No.	Weighted %
Age at first dose (yrs)				
8-10	12	4.0	8	4.4
8	1	0.2	1	0.3
9	2	0.6	0	0.0
10	9	3.2	7	4.1
11-12	87	16.1	20	8.2
11	22	4.3	3	0.9
12	65	11.8	17	7.3
13-17	291	59.9	115	56.3
13	71	15.4	17	6.8
14	58	13.3	23	9.9
15	68	12.5	23	13.6
16	50	10.4	35	17.3
17	44	8.3	17	8.7
18	28	7.7	34	16.0
19-26	72	12.3	39	15.1
19	20	3.9	7	2.4
20	11	1.8	7	4.0
21	10	2.0	6	1.3
22	11	1.7	8	4.1
23	7	0.8	5	1.7
24	6	0.7	3	0.9
25	4	0.7	3	0.8
26	3	0.7	0	0.0
Difference between age at interview and age at first dose (yrs)				
0	14	2.6	5	1.6
1	18	3.0	16	7.4
2	20	6.2	14	5.9
3	18	3.6	24	13.8
4	19	4.5	20	9.2
5	29	6.5	18	11.1
6	42	9.5	25	14.4
7	39	9.1	25	11.2
8	57	12.7	20	7.3
9	53	9.6	19	8.1
10	71	12.5	13	4.7
11	53	9.0	9	2.8
12	26	5.7	2	0.6
13	16	2.9	5	1.0
14	10	1.7	1	0.7
15	4	0.7	0	0.0
16	1	0.1	0	0.0

Abbreviation: HPV = Human papillomavirus.

* Respondents were asked, "How old were you when you received your first HPV shot?"

[†] The simple difference between age reported at time of interview and age the respondent indicated the first dose of the HPV vaccine was received. A difference of "zero" indicates that a respondent's reported age at first dose was the same as their age at interview.

[§] Among female respondents aged 19-26 years who received the first HPV shot (n=580), 90 (15.5%) of those who didn't answer what age they received the first HPV shot were excluded from the analysis.

[¶] Among male respondents aged 19-26 years who received the first HPV shot (n=274), 58 (21.2%) of those who didn't answer what age they received the first HPV shot were excluded from the analysis.